EXHIBIT 8

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
SHERMAN DIVISION

MOBILITY WORKX, LLC,

                      Plaintiff,

       v.

CELLCO PARTNERSHIP D/B/A
VERIZON WIRELESS,

                      Defendant.

Civil Action No.: 4:17-CV-00872-ALM

REBUTTAL EXPERT REPORT OF JAMES A. PROCTOR, JR., M.S.E.E. REGARDING NON-INFRINGEMENT OF THE ASSERTED CLAIMS

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35.   Although there is some overlap between Dr. Nair's opinion and mine, Dr. Nair's definition of a POSITA may be overly broad because, for example, "experience in systems relating to wireless communications" may not afford sufficient knowledge or experience relevant to the alleged inventions of the '330 and '417 Patents, which at a high level involve wireless network simulation and handovers, respectively. To the extent Dr. Nair's opinion is of such broad scope, I disagree. Notwithstanding, any differences between the two articulated levels of skill do not affect either my non-infringement or invalidity analyses. Under any expert's proposed levels of ordinary skill, I would have qualified as a person of ordinary skill in the art as of the priority dates of the Asserted Patents.

VI.   TECHNOLOGY BACKGROUND

36.   In my Opening Invalidity Report, I provided an overview of the background technology relevant to understanding the alleged invention of the '417 Patent, including the general architecture of communications networks, the Internet Protocol (IP), the Mobile IP standard, and prior art cellular telecommunication systems, as well as the evolution of such systems to LTE. *See* Opening Invalidity Report at ¶¶ 60-159. I also provided an overview of the background technology relevant to understanding the alleged invention of the '330 Patent, including the background of compliance testing, compliance testing oversight, operator acceptance testing, minimum performance standards set by industry organizations, commercial test equipment, as well as academic and industry research for wireless using network emulators. *See* Opening Invalidity Report at ¶¶ 160-88. I incorporate by reference my Opening Invalidity Report herein.

A.   The LTE Architecture

37.   The figure below generally illustrates the different network components of a Long Term Evolution (LTE) network and the interfaces between them. In addition to the LTE network,

the prior art and legacy packet data networks (UTRAN(3G) and GERAN (2G)) are depicted, which

as explained in my opening report, operated substantially the same as LTE with respect to the

infringement theories.
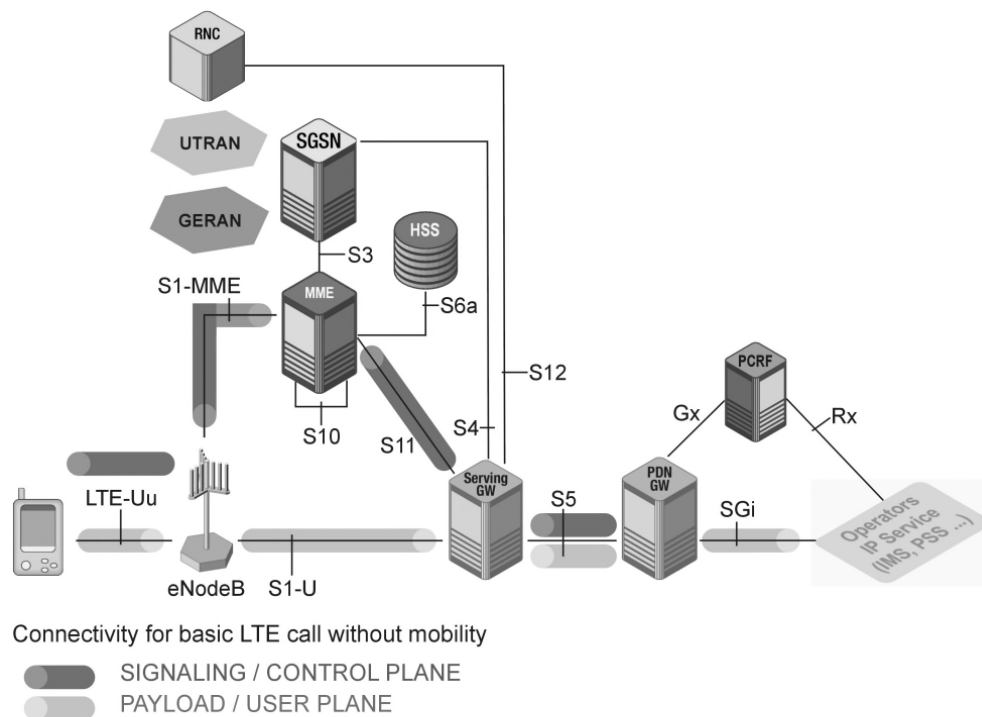
Figure 1.11 Connection via E-UTRAN non-roaming architecture.

Kreher et al., "LTE Signaling: Troubleshooting & Optimization" (2011) ("LTE Signaling"), at

14 (Fig. 1.11).

    38.   The Evolved Packet Core (EPC), or core network, is responsible for the overall

control of the user equipment (UE) and the establishment of the bearers, wherein the main logical

nodes of the EPC include the PDN Gateway (P-GW), the Serving Gateway (S-GW), and the

Mobility Management Entity (MME).   Generally, these nodes are responsible for the following:

- The **P-GW** is generally responsible for providing access to external packet data networks (PDN) (*e.g.*, Internet), IP address allocation for the UE, quality of service enforcement,

and flow-based charging. I note that in LTE, there is no registration to the P-GW by a UE. Rather, all control messaging with the PGW is coordinated by the MME.

- The **S-GW** generally serves as the local mobility anchor point for inter-eNodeB handovers as well as for inter-working with other 3GPP technologies such as GPRS and UMTS.

- The **MME** is the control node which processes the signaling between the UE and the rest of the EPC. Its responsibilities include establishing, maintaining, and releasing bearers on behalf of the UE. Additionally, the MME coordinates with the P-GW to perform IP address allocation, forwarding the allocated IP address to the UE, for use in the duration of the session (remaining the same independent of handovers between cells).

39. The wireless access network of LTE is called the Evolved Terrestrial Radio Access Network (E-UTRAN), which simply consists of a network of eNodeBs (or eNB). The eNBs are typically inter-connected with each other by means of an interface known as X2, and to the EPC by means of an interface known as S1. The E-UTRAN is responsible for all radio-related functions for the UE, including radio resource management and connectivity to the EPC. Additionally the eNodeB may comprise multiple (up to 256) cells.

40. The air interface between UEs and eNBs is called the Uu interface. For control messaging no IP protocol is used what so ever, rather the RRC protocol between the UE and the eNodeB is utilized, and when registering with the MME the RRC protocol carries Non-Access Stratum ("NAS") messaging. NAS protocols support the mobility of the UE and the session management procedures to establish and maintain IP connectivity between the UE and a PDN GW. The LTE network "looks like" a Layer 2 to the upper network layers for both the control plane and the user (payload data) plane. Neither of these protocols utilize the IP protocol between the eNodeB and the UE (see Fig. 4.3.1-2 below). As mentioned, for the control plane the RRC

protocol operates at the network layer protocol on top of the layer 2 PDCP/RLC, rather than carrying IP at all. All network control messages in LTE, including those associated with handovers, measurement reports, and registrations utilize the RRC protocol rather than using IP protocols over the Uu interface. The figures below illustrate the user-plane and the control plane between the UE and the eNB.
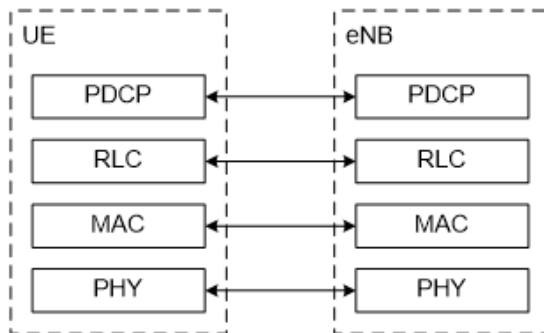
Figure 4.3.1-1: User-plane protocol stack

3GPP TS 36.300 v.8.9.0 at § 4.3.1.
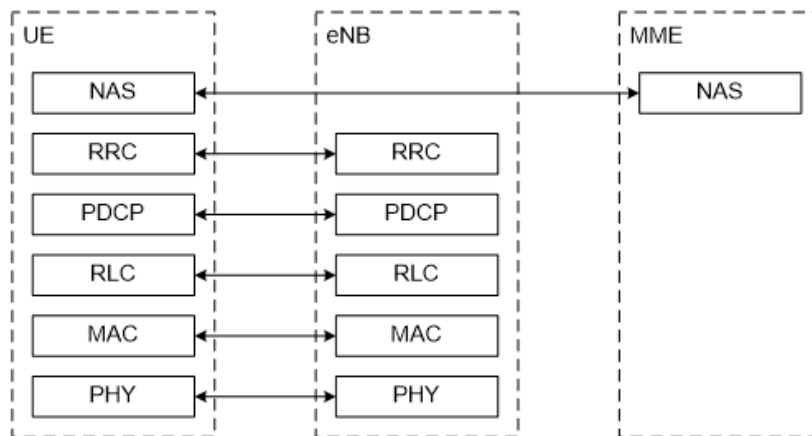
Figure 4.3.2-1: Control-plane protocol stack

Id. at § 4.3.2.

41.   As I discussed in my Opening Invalidity Report, many of the interfaces in prior art 3G UMTS systems were IP-based as well. *See* Opening Invalidity Report at ¶¶ 105-11. Notably, while the earlier releases of the UMTS standard specified that IP communications would be over

ATM, Release 5 of the UMTS standard no longer specified the transport layers between UTRAN nodes. *See* 3GPP TR 25.933 v5.1.0 ("IP transport in the UTRAN") at § 5.5; *see also* Opening Invalidity Report. Additionally, the 3GPP defined a term "All IP Network" (APIN), which encompassed more than simply using IP transport between nodes, but also included incorporating non-3GPP and other access networks (*e.g.*, Wi-Max, Wi-Fi, wireline VoIP, etc.). "It should be noted that the 3GPP system standardized up to and including Rel-6 already provides the basis for introduction of an AIPN in 3GPP. Building on the foundations provided in previous 3GPP releases it is possible to leverage and build upon existing capabilities to evolve the 3GPP system towards an AIPN." 3GPP TR 22.978 v7.1.0 at § 4.2. In other words, many of the advantageous features of LTE that Dr. Nair describes were well known and well underway before the invention of the '417 Patent.

42.   GSM, UMTS, and LTE (and various versions thereof) each have numerous and different requirements such that a user equipment that works on one access technology will not automatically work on another. However, in the context of how a user equipment behaves during handovers between cells, a user equipment operates in a substantially similar manner in GSM, UMTS, and LTE handovers. In fact GSM, UMTS, and LTE each support versions of the "general packet radio service (GPRS) for packet data access (*see* Opening Invalidity Report at ¶¶ 102-11), and operate in substantially similar ways, including with respect to handover (*see id.* at ¶¶ 118-30). As discussed in my opening report, the SGSN and GGSN (in 2G/GSM and 3G/UMTS, respectively) comprise many of the same functions as SGW and PGW of LTE (*see id.* at ¶159). This is not surprising as LTE was developed by the same organization (3GPP) as UMTS, which evolved from GSM. *See also* Sesia et al., "LTE – The UMTS Long Term Evolution: From Theory to Practice" (2011) ("Sesia") at 1-5 (Fig. 1.1 reproduced below).
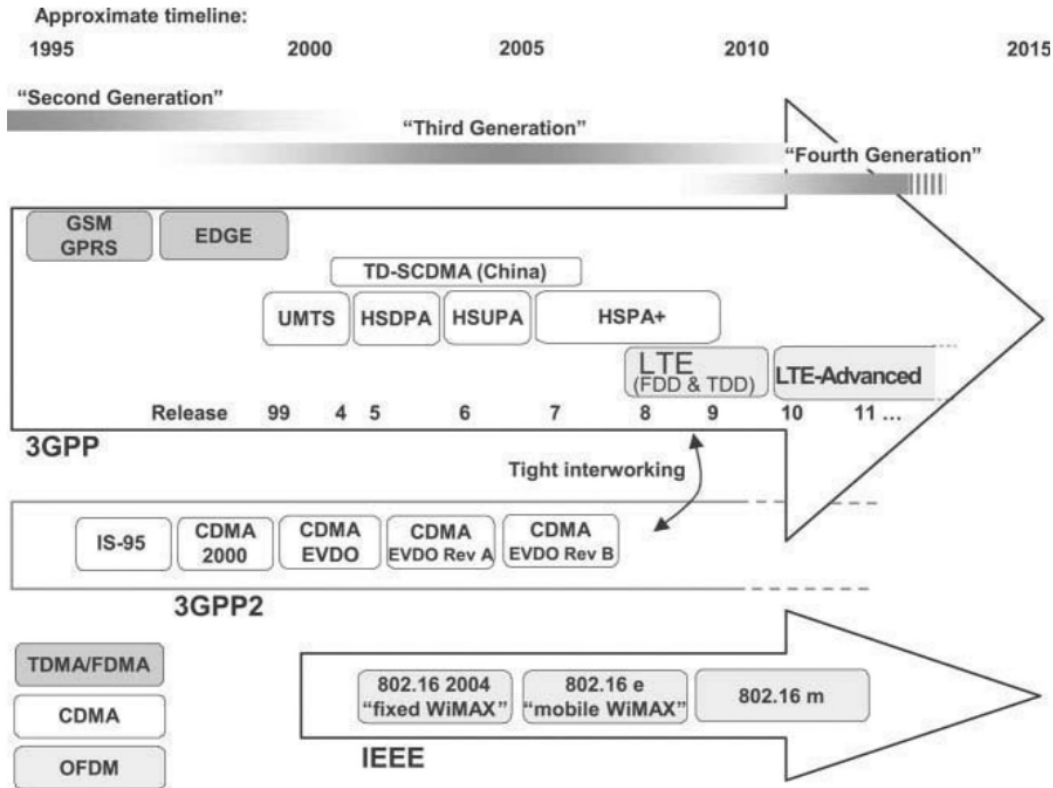
Figure 1.1: Approximate timeline of the mobile communications standards landscape.

43. For example, as I discussed in my Opening Invalidity Report, the handover processes in LTE, UMTS, and GSM are all network-controlled and mobile-assisted. *See, e.g.*, Opening Invalidity Report at ¶¶ 100-101, 114. Also, as previously explained, the handover process is based upon the network receiving signal strength measurement reports from the user equipment, and the network determining that the UE is within the coverage area of a target cell, and that the current serving cell's quality is such that a handover is warranted. Also as discussed, all three standards include a handoff preparation phase and a handoff execution phase, in which the handoff preparation phase involves interacting with the target cell and allocating resources prior to the command to perform a handoff is sent to the UE. *See, e.g.*, 3GPP TS 36.300 v10.1.0 at § 10.1.2.1 ("The intra E-UTRAN HO in RRC_CONNECTED state is UE assisted NW controlled HO, with HO preparation signalling in E-UTRAN."). It should also be noted that handover is ***only***

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performed in the RRC_CONNECTED state, whereas "cell re-selection" is performed in the RRC_IDLE state. Thus, cell reselection does not involve the handover preparation phase and is not relevant to the accused handover processes. Cell reselection does not include the handover command, and accordingly no handover preparation phase. Dr. Nair would agree. Nair Report at ¶ 197 ("That means that any UE is in RRC_CONNECTED state to perform handoff. Any UE in RRC_IDLE state does cell reselection, which is different from handover.") Therefore, cell reselection is unrelated to the Plaintiff's infringement theories. I discuss the UE states and cell reselection in more detail below.

B.   X2 and S1 Handovers in LTE

44.   The figure below generally illustrates the E-UTRAN, wherein neighboring eNBs are inter-connected by the X2 interface and are connected to the MME and S-GW by means of the S1 interface.
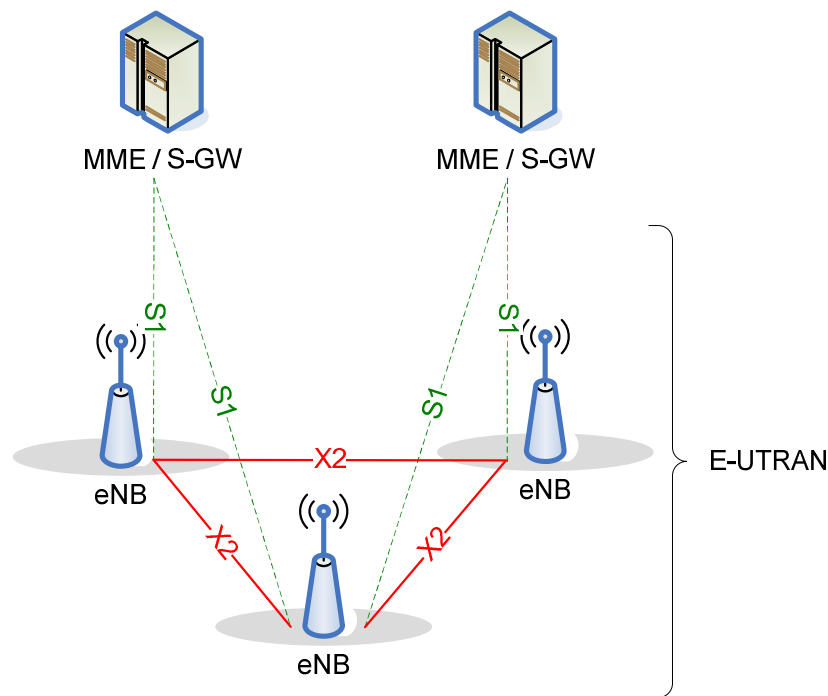
3GPP TS 36.300 v.8.9.0 at Fig. 4-1.

45.   An X2 handover, also called an intra-MME handover, involves handing over a UE from a source eNB to a target eNB that are both controlled by a single Multimedia Management Entity (MME) / Serving Gateway (S-GW). The X2 handover is initiated over the X2 interface. If for some reason there is no X2 interface between two eNBs, the network performs an S1 handover (or inter-MME handover) initiated over the S1 Interface. For example, eNBs that belong to separate MMEs may not have a common X2 interface, in which case an X2 handover is performed.

46.   Below is an exemplary flow diagram of the signaling involved in an X2 handover. 3GPP TS 36.300 v.8.9.0 at Fig. 10.1.2.1.1-1 (reproduced below); *see also* 3GPP TS 23.401 v.10.3.0 at § 5.5.1.1.
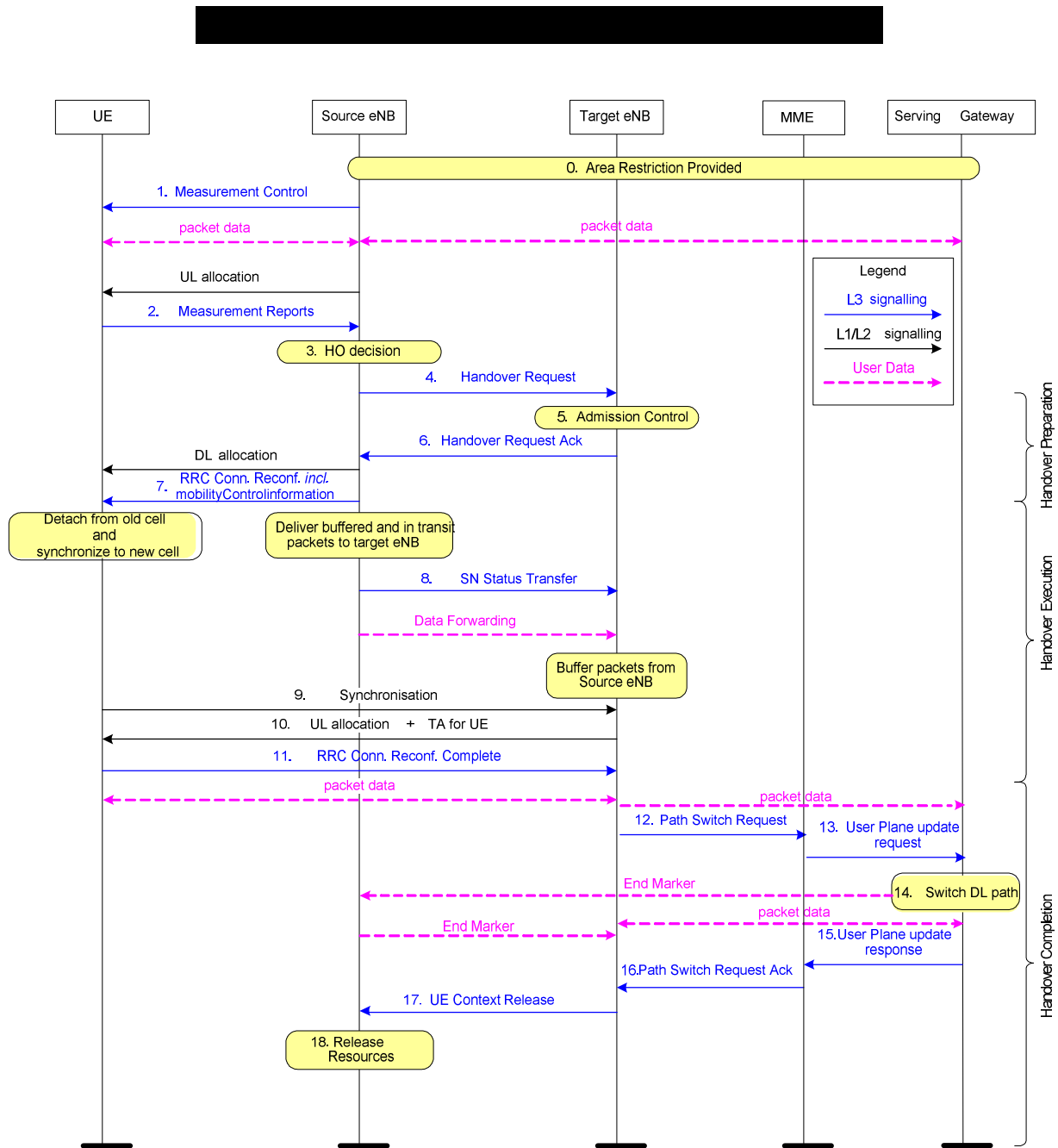
47. UEs are configured by the network via an RRCConnectionReconfiguration message to report what it "sees" in the form of signal strength and signal quality measurements of all other cells it can detect (some of which will generally belong to the same eNodeB as that of the currently serving cell, and corresponding to other sectors and/or other frequency bands of operation). The RRCConnectionReconfiguration message may provide configuration elements

such as measurement objects, reporting configurations, measurement identities, quantity configurations, and measurement gaps. The figure below is an example of measurement configurations provided to the UE.
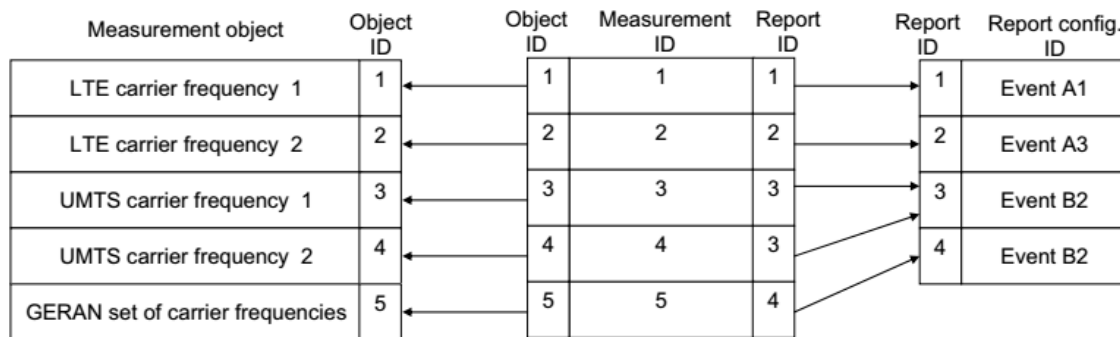
Sesia et al., "LTE – The UMTS Long Term Evolution: From Theory to Practice" (2011) ("Sesia"), at 76 (Fig. 3.9).

48.   As a UE comes within communication range of neighboring eNBs, the UE periodically measures the signal strength of those neighboring eNBs. The UE will report its measurements to the Source eNB if certain events are triggered. These events can include:

Event	Trigger
A1	Source eNB signal becomes better than a threshold
A2	Source eNB signal becomes worse than a threshold
A3	Neighboring eNB signal becomes better than Source eNB by a threshold
A4	Neighboring eNB signal becomes better than a threshold
A5	Source eNB signal becomes worse than a first threshold and a Neighboring eNB becomes better than a second threshold

See 3GPP TS 36.331 v.10.7.0 at §§ 5.5.4.1-5.5.4.6. As an example, the figure below illustrates the triggering of Event A3 when a time-to-trigger and an offset are configured.
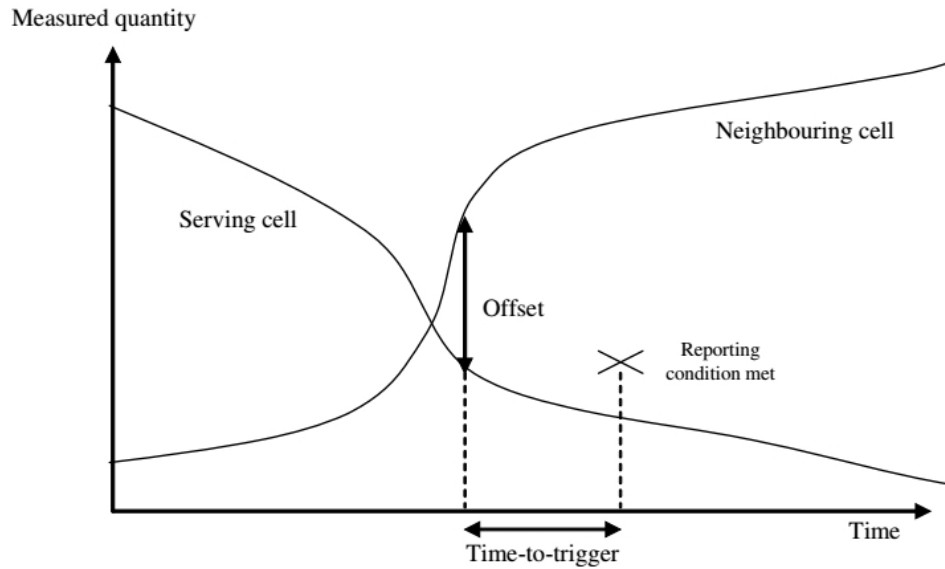
Figure 3.10: Event triggered report condition (Event A3).

Sesia at 77 (Fig. 3.10).

49.   It should be noted that the UMTS system included substantially similar measurement reporting approaches, including triggering events based upon thresholds, hysteresis and time-to-trigger values, like LTE.   *See* Opening Invalidity Report at ¶¶ 121-22.

50.   During the Handover Preparation phase, the Source eNB makes a decision whether to handover the UE to the Target eNB based on the UE's measurement reports and other considerations. If the Source eNB determines that a handover is appropriate, it sends a Handover Request to the Target eNB. ██

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████████████████████████████ [2]

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[2] ███

51.   During the Handover Execution phase, the UE detaches from the source eNB and synchronizes to the Target eNB, while the Source eNB optionally forwards any incoming data for the UE to the Target eNB.

52.   During the Handover Completion phase, the Target eNB sends a request to the MME and S-GW to switch the downlink data path for the UE to the Target eNB. The Target eNB then sends a message to the Source eNB, allowing it to finally release the resources that were reserved for the UE.

53.   Below is an exemplary flow diagram of the signaling involved for an S1 handover.
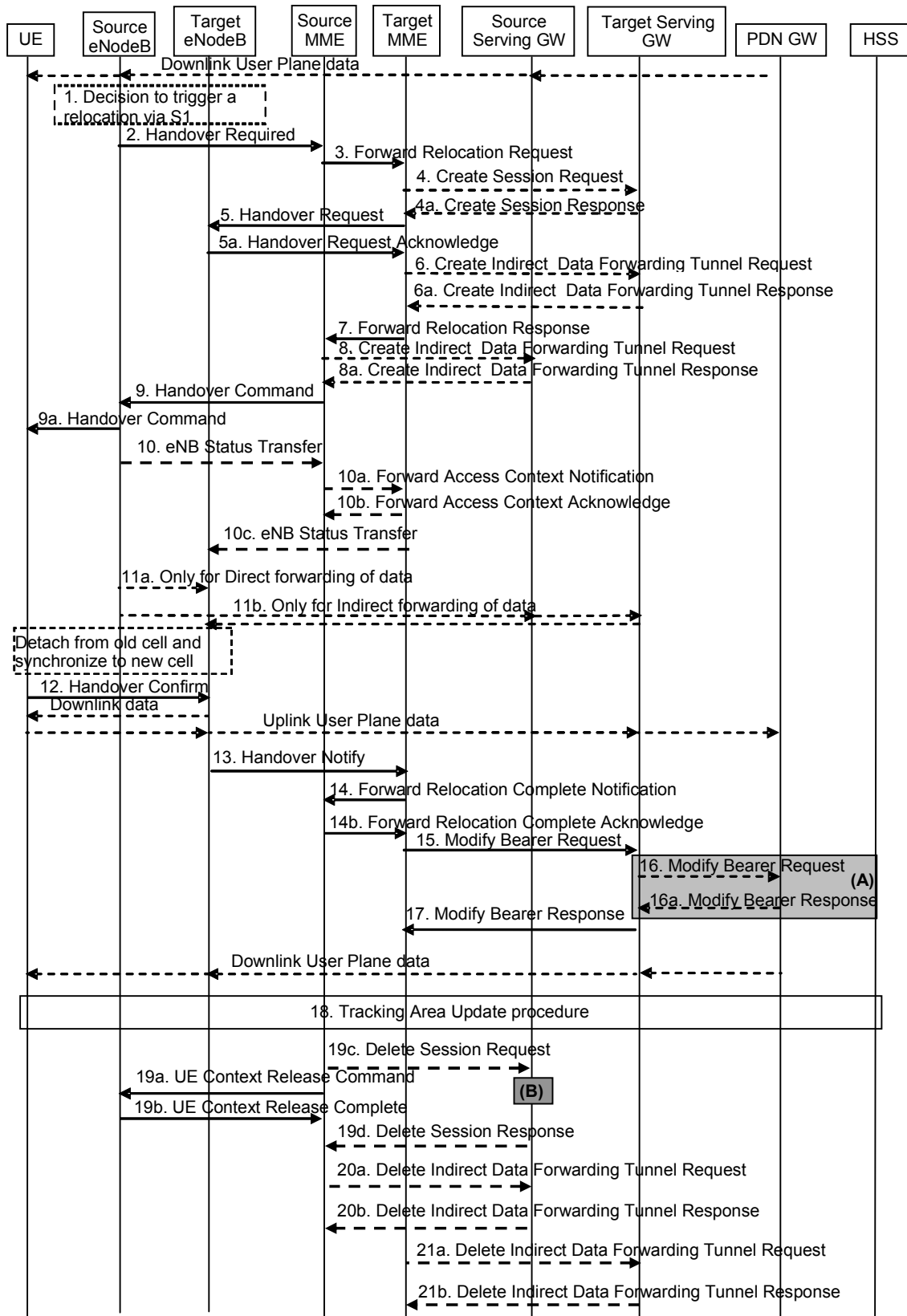
3GPP TS 23.401 v10.3.0 at § 5.5.1.2 (Fig. 5.5.1.2.2-1 reproduced above); *see also* 3GPP TS 36.300 v.8.9.0 at § 19.2.2.5.

54.   Like in the X2 handover, the UE measures the signal strength of neighboring eNBs and reports the measurements to the Source eNB if an event is triggered. The Source eNB then determines whether a handover is appropriate or required based upon the received measurement report. When it does, the UE will detach from the Source eNB, and the Source eNB will send a status transfer to the Target eNB—but indirectly via the Source MME and Target MME. Similarly, the status transfer procedure may also include data forwarding for the UE from the Source eNB to the Target eNB. Finally, the Target eNB sends a confirmation of the handover to the Target MME. This triggers a data path switch for the UE in the S-GW to the Target eNB and allows the Source eNB to release the resources that were held for the UE.

C.   **Other Relevant Considerations in LTE**

55.   In view of Mobility's and Dr. Nair's infringement allegations, there are several other considerations regarding LTE worth discussing.

56.   When a UE is first turned on, it will first listen for radio signals from a nearby eNB or eNBs, generally in the form of a master information block (MIB) and system information blocks (SIBs) that an eNB periodically broadcasts to all UEs in its cells. The MIB and SIB Type 1 (SIB1) contain the parameters needed for a UE to begin its initial connection to the eNB.

57.   The UE then performs random access and RRC connection setup procedures to connect to the eNB. The random access procedure is necessary for a UE to synchronize its uplink transmissions to the eNB, and there are two forms, contention-based or contention-free. Content-based random access is generally more common, and the steps involved at a high level are illustrated in the figure below.

UE   eNB

1 ──Random Access Preamble──→

2 ←──Random Access Response──

3 ──Scheduled Transmission──→

4 ←──Contention Resolution──
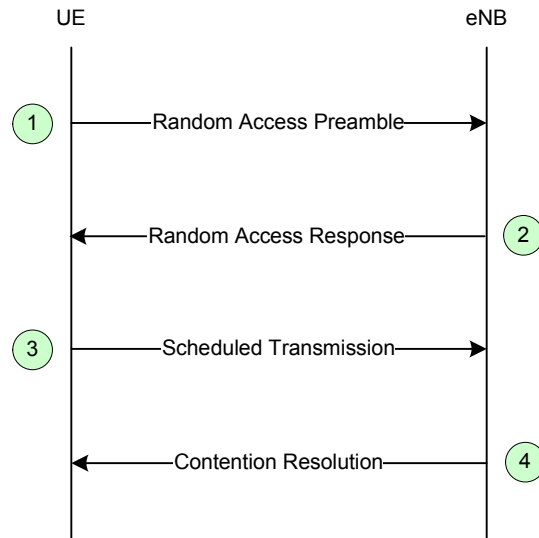
3GPP TS 36.300 v.10.7.0 at § 10.1.5.1 (Fig. 10.1.5.1-1).

58.   Thereafter, the UE can establish a Radio Resource Control (RRC) connection with the eNB by sending an RRC Connection Request message. If the eNB accepts the connection, it returns the RRC Connection Setup message that includes the initial radio resource configuration. The UE acknowledges the message with an RRC Connection Complete message. *See* 3GPP TS 36.331 v.10.7.0 at § 5.3.3; *see also* Sesia at 66 (Fig. 3.6 reproduced below).
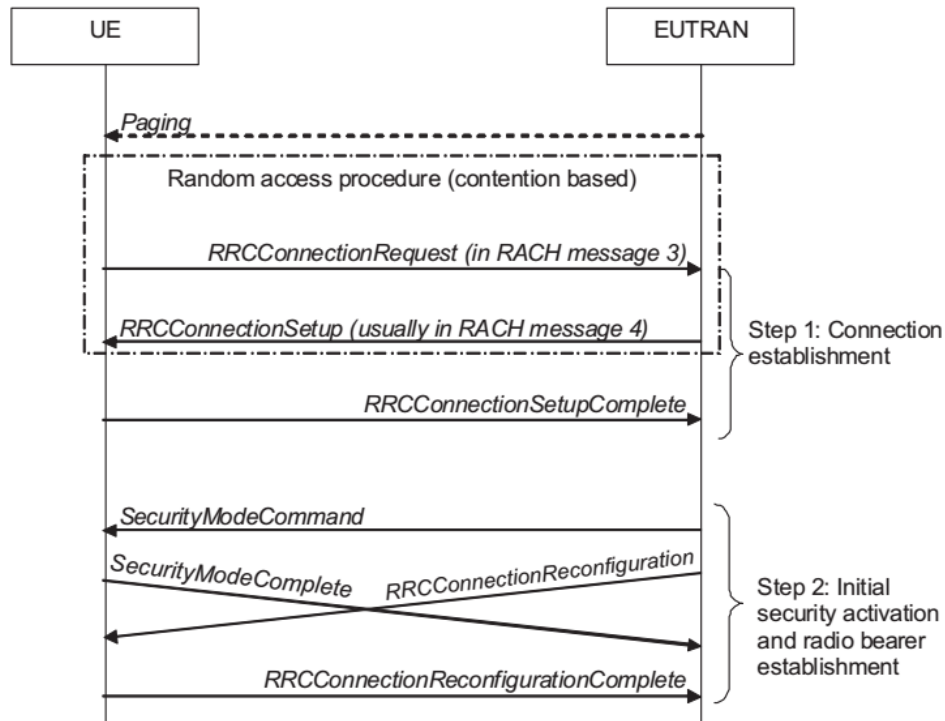
59. Then, for the UE to get on the network and start receiving services, a UE must register and "attach" to the network. The attach procedure, illustrated in the figure below, triggers one or multiple Dedicated Bearer Establishment procedures to establish dedicated EPS bearer(s) for the UE. *See* 3GPP TS 23.401 v.10.3.0 at § 5.3.2.1 (Fig. 5.3.2.1-1 reproduced below).

UE | eNodeB | new MME | Old MME/SGSN | Serving GW | PDN GW | PCRF | HSS

1. Attach Request

2. Attach Request

EIR

3. Identification Request

3. Identification Response

4. Identity Request

4. Identity Response

5a. Authentication / Security

5b. Identity Request/Response

5b. ME Identity Check

6. Ciphered Options Request

6. Ciphered Options Response

(E)
7. Delete Sesion Request

7. Delete Session Response

7. PCEF Initiated IP-CAN Session Termination

(A)

8. Update Location Request

9. Cancel Location

9. Cancel Location Ack

(F)
10. Delete Session Request

10. Delete Session Response

10. PCEF Initiated IP-CAN Session Termination

(B)

11. Update Location Ack

12. Create Session Request

13. Create Session Request

14. PCEF Initiated IP-CAN Session Establishment/Modification

(C)

15. Create Session Response

First Downlink Data (if not handover)

16. Create Session Response

17. Initial Context Setup Request / Attach Accept

18. RRC Connection Reconfiguration

19. RRC Connection Reconfiguration Complete

20. Initial Context Setup Response

21. Direct Transfer

22. Attach Complete

First Uplink Data

23. Modify Bearer Request

23a. Modify Bearer Request

23b. Modify Bearer Response

(D)

24. Modify Bearer Response

First Downlink Data

25. Notify Request

26. Notify Response

26

60.   The UE initiates the Attach procedure by sending an Attach Request message to the serving eNB. The Attach Request message includes numerous information elements: IMSI or old GUTI, Old GUTI type, last visited TAI (if available), UE Core Network Capability, UE Specific DRX parameters, Attach Type, ESM message container (Request Type, PDN Type, Protocol Configuration Options, Ciphered Options Transfer Flag), KSI$_{ASME}$, NAS sequence number, NAS-MAC, additional GUTI, P-TMSI signature, Voice domain preference and UE's usage setting, MS Network Capability. *Id.*

61.   The eNB forwards the Attach Request to the MME. Thereafter various information is exchanged between the UE and the various network nodes before the UE is deemed attached to the network and able to receive network services, as illustrated above. *Id.* Notably, as part of the UE attachment procedure, the UE is assigned an IP address by the P-GW and at least one bearer is established, and it remains established through the lifetime of the PDN connection in order to provide the UE with always-on IP connectivity to that PDN. *Id.*; Sesia at 37. It is notable that the UE does not request or receive the IP address directly from the PGW (see steps 12-17 in the above figure). All control information flow related to connecting to services is handled directly between the MME and the UE, utilizing the NAS protocol. The MME will coordinate with the PGW to determine the assigned IP address (see step 12 in the above figure), and provide it to the UE. To be clear, there is never a registration message sent by the UE to the P-GW, or any other control information for that matter. The same is true for the S-GW—neither a registration request nor other control information is ever sent from the UE to the S-GW, as the "control plane" and "user plane" were separated in LTE, with the MME handling all such control processes with the core

network. This is one difference between LTE and UMTS as the prior art SGSN did handle some control messaging with the UE (such as registration). *See* Opening Invalidity Report at ¶ 104.

62.   With regard to the radio access network, the UE can have two different states: RRC_CONNECTED and RRC_IDLE. *See, e.g.*, 3GPP TS 36.331 v.10.7.0 at § 4.2.1.

63.   An RRC_IDLE state means that the radio connection is inactive. The UE mobility is not under control of the network and the UE does not need to send any measurement reports for updating, although it performs neighbor cell measurement for cell (re)selection. The UE will continue to monitor for incoming calls on the physical channel and system information broadcasted by the eNB.

64.   In the RRC_CONNECTED state the UE is able to send and receive data in the uplink and downlink transmission channels. It measures the downlink radio quality of neighbor cells and sends RRC measurement reports according to the measurement configuration received from the MME.

65.   One of the important differences between RRC_IDLE and RRC_CONNECTED is the difference in the mobility procedures available in each state, as illustrated in the figure below.
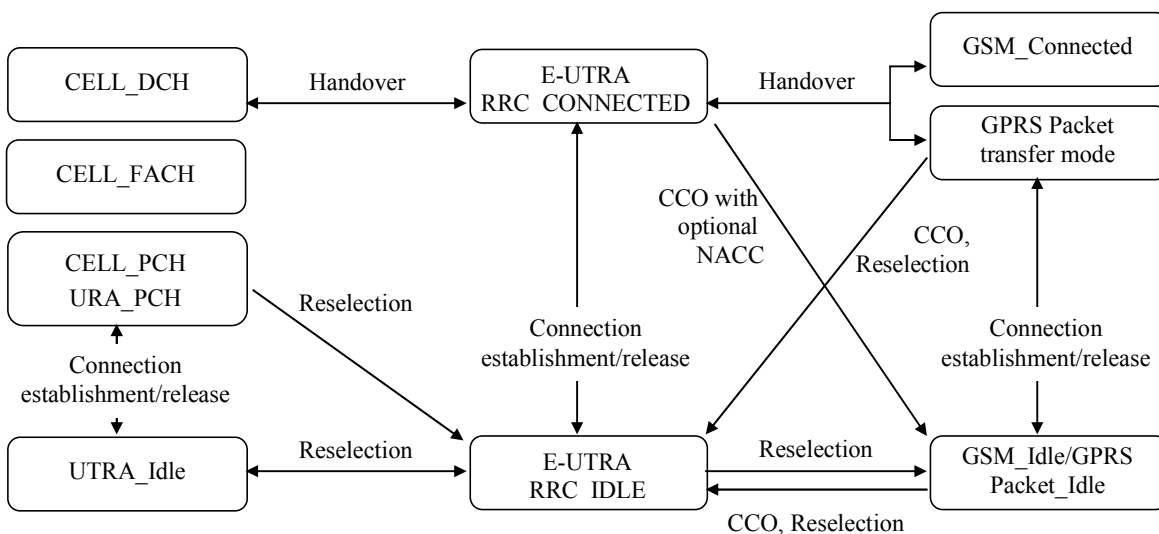
3GPP TS 36.331 v.10.7.0 at § 4.2.1 (Fig. 4.2.1-1). In RRC_IDLE, mobility is controlled by the

UE and is called "cell (re)selection," while in RRC_CONNECTED mobility is controlled by the

eNB and is called a "handover," *i.e.*, the X2 and S1 handovers discussed above. Handovers and

cell (re)section are thus different, and Dr. Nair acknowledges this distinction. Nair Report at ¶ 197.

66.   Below is an explanation of cell reselection from the 3GPP LTE specifications.

10.1.1.2   Cell reselection

A UE in RRC_IDLE performs cell reselection. The principles of the procedure are the following:

- The UE makes measurements of attributes of the serving and neighbour cells to enable the reselection process:

    - There is no need to indicate neighbouring cells in the serving cell system information to enable the UE to search and measure a cell i.e. E-UTRAN relies on the UE to detect the neighbouring cells;

    - For the search and measurement of inter-frequency neighbouring cells, only the carrier frequencies need to be indicated;

    - Measurements may be omitted if the serving cell attribute fulfils particular search or measurement criteria.

- Cell reselection identifies the cell that the UE should camp on. It is based on cell reselection criteria which involves measurements of the serving and neighbour cells:

    - Intra-frequency reselection is based on ranking of cells;

    - Inter-frequency reselection is based on absolute priorities where a UE tries to camp on the highest priority frequency available. Absolute priorities for reselection are provided only by the RPLMN and are valid only within the RPLMN; priorities are given by the system information and are valid for all UEs in a cell, specific priorities per UE can be signalled in the RRC Connection Release message. A validity time can be associated with UE specific priorities.

    - For inter-frequency neighbouring cells, it is possible to indicate layer-specific cell reselection parameters (e.g., layer specific offset). These parameters are common to all neighbouring cells on a frequency;

    - An NCL can be provided by the serving cell to handle specific cases for intra- and inter-frequency neighbouring cells. This NCL contains cell specific cell reselection parameters (e.g., cell specific offset) for specific neighbouring cells;

    - Black lists can be provided to prevent the UE from reselecting to specific intra- and inter-frequency neighbouring cells;

    - Cell reselection can be speed dependent (speed detection based on UTRAN solution);

    - Cell reselection parameters are applicable for all UEs in a cell, but it is possible to configure specific reselection parameters per UE group or per UE.

3GPP TS 36.300 v.10.7.0 at § 10.1.1.2.

67. Relatedly, certain system information blocks (SIBs) are specifically intended for cell reselection for a UE that is in RRC_IDLE mode only, particularly SIB4 and SIB5 messages, as shown in the table below.

Message	Content	Period (ms)	Applicability
MIB	Most essential parameters	40	Idle and connected
SIB1	Cell access related parameters, scheduling information	80	Idle and connected
1st SI	SIB2: Common and shared channel configuration	160	Idle and connected
2nd SI	SIB3: Common cell reselection information and intra-frequency cell reselection parameters other than the neighbouring cell information SIB4: Intra-frequency neighbouring cell information	320	Idle only
3rd SI	SIB5: Inter-frequency cell reselection information	640	Idle only
4th SI	SIB6: UTRA cell reselection information SIB7: GERAN cell reselection information	640	Idle only, depending on UE support of UMTS or GERAN

Sesia at 60; *see also* 3GPP TS 36.331 v.10.7.0 at § 6.3.1.

68. It should be noted that the prior art UMTS system transmitted similar system information blocks as well.

VII. THE ALLEGED INVENTION OF THE '417 PATENT

69. In my Opening Invalidity Report, I provided a brief discussion of the alleged invention of the '417 Patent based upon the intrinsic evidence, which I incorporate by reference herein. *See* Opening Invalidity Report at ¶¶ 189-208. I have also reviewed and may refer to Verizon's Technology Tutorial dated February 7, 2019, which also discusses the alleged invention of the '417 Patent.

70. I have also reviewed Dr. Hernandez's dissertation and dissertation defense, and believe they are relevant to understanding the alleged invention of the Asserted Patents and the

B. Additional Considerations Regarding Claim Terms

105. Although the Court construed certain terms raised by the parties in the claim construction process, in my opinion, additional issues have arisen based on positions Mobility Workx and Dr. Nair have taken in the Nair Report that must be addressed for the purposes of assessing infringement. In particular, I disagree with Plaintiff's and Dr. Nair's approach to the following claim terms/issues.

1. "Home Agent" vs. "Foreign Agent"

106. Claim 1 of the '417 Patent requires "at least one home agent" and "at least one foreign agent." The term "home agent" was not construed, but the Court construed the term "foreign agent" as "a network node on a visited network that assists the mobile node in receiving communications." This construction is an adoption of this Court's construction in *Mobility Workx, LLC v. T-Mobile US, Inc., et al.*, Dkt No. 48, No. 4:17-cv-567-ALM (E.D. Tex. July 31, 2018) ("T-Mobile Claim Construction Order"), in which the Court stated:

> Nonetheless, Defendants properly criticize Plaintiff's proposed construction as encompassing home agents as well as foreign agents. Plaintiff's expert has acknowledged that Plaintiff's proposed construction might encompass any type of router. ***The patents-in-suit, by contrast, distinguish between home agents and foreign agents***. *See, e.g.*, '508 Patent at Cls. 6 & 8 (reciting a "home agent"); '417 Patent at Cl. 1 (reciting "at least one home agent" and "at least one foreign agent"). ***The above-reproduced disclosure, for example, likewise reinforces that there is a distinction between home agents and foreign agents***. *See* '508 Patent at 1:35–59. Additional disclosure cited by Plaintiff, as to foreign agents being implemented by software or by special-purpose hardware, does not compel otherwise. *See id.* at 4:45–49.

T-Mobile Claim Construction Order at 17 (internal citations omitted) (emphasis added).

107. In this case, I have been informed that the Court rejected Mobility's proposed construction for "foreign agent" as "a network node on a network that has a different network prefix and that requires a tunnel to assist the mobile node in receiving communications." Claim

Construction Order at 7-13. Specifically, the Court stated that "Plaintiff presented no evidence that tunneling is always necessary for the claims to be operable, and Plaintiff cited nothing in the specification that defines 'foreign agent' in terms of tunneling." *Id.* at 12. Also, with regard to a network prefix, the Courted stated "Plaintiff has neither submitted evidence demonstrating that 'network prefix' has a readily understood meaning nor shown that this limitation is compelled by any particular evidence. Indeed, Plaintiff has urged the Court *not* to limit the claims to Mobile IP." *Id.* at 13.

108.   Nevertheless, in his report, Dr. Nair contends that the "home agent" is the P-GW in Verizon's LTE network. Nair Report at ¶¶ 210-15. He states that "a home agent is defined as the network that assigns an IP Address upon registration or first attachment to the network." *Id.* at ¶ 210. He further states that a "Home Agent is the agent that resides in the home network and functions as the internet gateway or router." *Id.* at ¶ 213. He further states that: "A home agent is a router on a mobile node's home network which tunnels datagrams for delivery to the mobile node when it is away from home. It maintains current location (IP address) information for the mobile node. It is used with one or more foreign agents." *Id.* Despite this, Dr. Nair fails to define a "home network" or even identify what would constitute a "home network" in Verizon's LTE network.

109.   With respect to the term "foreign agent," Dr. Nair states that "a visited network is a network other than the home network." *Id.* at ¶ 217. "A visited network or a foreign network, in Mobile IPv4 adheres to the definition 'A foreign network is the network in which a mobile node is operating when away from its home network.'" *Id.* at ¶ 218. "In general, when a mobile phone moves away from its home network and away from the home agent's local network, it will be in a foreign network or visited network." *Id.* at ¶ 219.

110.   At a high level, I generally agree with Dr. Nair's statements above with respect to the meaning of "foreign agent" and "visited network." I also agree that a "Home Agent is the agent that resides in the home network and functions as the internet gateway or router." However, as Dr. Nair appears to agree, the definition of the term "home network" is key to understanding the meaning of these terms.

111.   In my opinion, a person of ordinary skill in the art would understand the plain and ordinary meaning of the following terms in the context of the '417 Patent to require, at a minimum:

- A "**home agent**" is "a network node on a home network that assists the mobile node in receiving communications."

- A "**foreign agent**" is "a network node on a visited network that assists the mobile node in receiving communications."

- A "**home network**" is "a network separate from any visited network that provides a point of attachment to the Internet and to which a mobile node is capable of directly linking."

- A "**visited network**" is "a network separate from the home network that provides a point of attachment to the Internet and to which a mobile node is capable of directly linking."

112.   My understanding is consistent with both the intrinsic and extrinsic evidence. To understand the meaning of a "home network," the Mobile IPv4 standard is helpful, which Dr. Nair would agree since he relies upon it heavily, and since the alleged invention of the '417 Patent is built upon Mobile IPv4. *See, e.g.*, '417 Patent at 1:44-63, 7:33-36, 9:37-40, 11:52-55. As a starting point, the Mobile IPv4 standard defines "home agent" and "foreign agent" as follows:

> *Home Agent* - *A router on a mobile node's home network* which tunnels datagrams for delivery to the mobile node when it is away from home, and maintains current location information for the mobile node.
>
> *Foreign Agent* - *A router on a mobile node's visited network* which provides routing services to the mobile node while registered. The foreign agent detunnels and delivers datagrams to the mobile node that were tunneled by the mobile node's home agent. For datagrams

sent by a mobile node, the foreign agent may serve as a default router for registered mobile nodes.

IETF RFC 2002 at 5 (emphasis added). The Mobile IPv4 standard also provides the following relevant definitions:

Care-of Address - The termination point of a tunnel toward a mobile node, for datagrams forwarded to the mobile node while it is away from home. The protocol can use two different types of care-of address: a "foreign agent care-of address" is an address of a foreign agent with which the mobile node is registered, and a "co-located care-of address" is an externally obtained local address which the mobile node has associated with one of its own network interfaces.

Foreign Network - Any network other than the mobile node's Home Network.

Home Address - An IP address that is assigned for an extended period of time to a mobile node. It remains unchanged regardless of where the node is attached to the Internet.

Home Network - A network, possibly virtual, having a network prefix matching that of a mobile node's home address. Note that standard IP routing mechanisms will deliver datagrams destined to a mobile node's Home Address to the mobile node's Home Network.

Mobility Agent - Either a home agent or a foreign agent.

Tunnel - The path followed by a datagram while it is encapsulated. The model is that, while it is encapsulated, a datagram is routed to a knowledgeable decapsulating agent, which decapsulates the datagram and then correctly delivers it to its ultimate destination.

Visited Network - A network other than a mobile node's Home Network, to which the mobile node is currently connected.

Id. at 5-6.

113.   Given the Court's construction of "foreign agent" as being on a "a network node on a visited network that assists the mobile node in receiving communications," at a minimum the "home agent" should be similarly thought of as "a network node on a home network that assists the mobile node in receiving communications."

114.   The specification of the '417 Patent supports my opinion that the "home agent"

must be a network node in a "home network." Not only are there ample references to the Mobile

IP standard, but the specification also explicitly states:

> Mobile IP allows a mobile node to use two IP addresses, one being a fixed home address and the other being a care-of address. The care-of address changes as the mobile node moves between networks thereby changing its point of attachment to a network. ***When the mobile node links to a network other than one in which the home agent resides, the mobile node is said to have linked to a foreign network***. The ***home network provides the mobile node with an IP address and once the node moves to a foreign network and establishes a point of attachment***, the mobile node receives a care-of address assigned by the foreign network.

'417 Patent at 1:45-56 (emphasis added). The specification further states:

> ***The home agent 205 is a network node belonging to the network that is designated as the home network***. The network is a home network in the sense that it serves as a virtual permanent residence at which the mobile node 250 can receive communications from other network nodes, designated as correspondent nodes. ***By providing an addressable home, the home agent effectively allows the mobile node 250 to be reachable at its home address even when the mobile node 250 is not attached to the home network***. This is done in a manner analogous to the forwarding of mail to an out-of-town resident or call forwarding a telephone communication from a fixed to a mobile number. According to one embodiment of the present invention, the home agent 205 can be implemented as a software component executing on a suitable computing system, such as a server or other computing device. ***The home agent 205 can be communicatively linked with a network such as the Internet***, thereby enabling two-way communications between the home agent 205 and a foreign agent 210.

Id. at 5:9-27 (emphasis added). The specification further states:

> The foreign agents 210, 215, 230 exist foreign networks in so far as they are part of networks to which the mobile node 250 is communicatively linked ***when the mobile node 250 is not linked directly with its home network***. Even when the mobile node 250 is not directly linked with its home network, though, it can receive communications.

Id. at 5:28-33 (emphasis added).

115.   Regarding the meaning of a "home network," the above citations in the specification of the '417 Patent also make clear that, at a minimum, the "home network" is: (i) a point of attachment to a larger communications network (*e.g.*, the Internet), (ii) to which a mobile node is capable of directly linking (*i.e.*, without going through a different network like a "visited network"). *See id.* at 1:45-2:9, 5:9-33.

116.   A "visited network" is simply "a network other than a mobile node's Home Network, to which the mobile node is currently connected," as defined in the Mobile IPv4 standard. IETF RFC 2002 at 6. That is because a "home network" for one mobile node can be a "visited network" for another mobile node, and vice versa. In other words, the defining characteristic of a "visited network" is that it is *a separate network* from the "home network" (and any other visited network for that matter). Therefore, it is a *separate* point of attachment to the same, larger communications network (*e.g.*, the Internet) to which a mobile node is capable of directly linking *separately* (*i.e.*, without going through the "home network").

117.   The following figure illustrates how a "home network" and a "visited network" (or "foreign network") are mutually exclusive networks, and how a "home agent" and "foreign agent" are located therein, respectively.

53
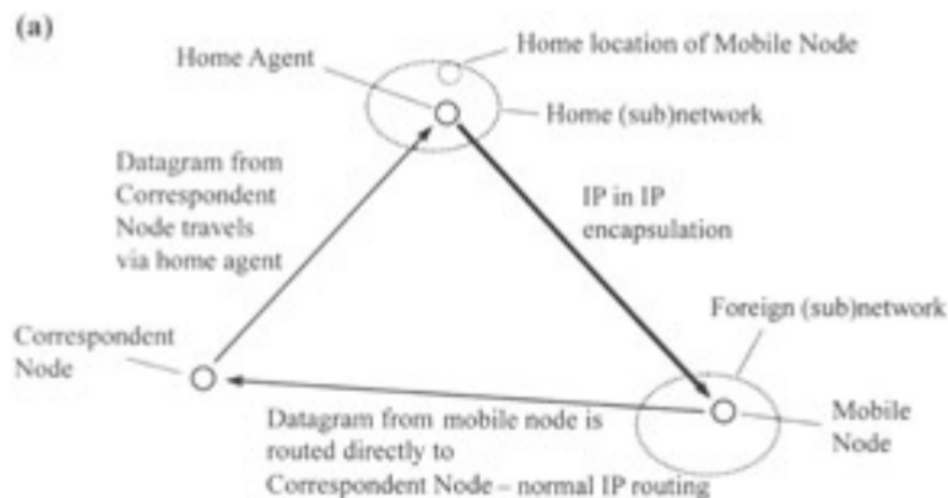
Wisely, "IP for 3G – Networking Technologies for Mobile Communications" (2002) ("IP for 3G"), at 125 (Fig. 5.3(a)).

118.   Figure 1 of the '417 Patent, reproduced below, also illustrates the separation between the home network and foreign network, albeit using a hierarchical foreign agent scheme that was well known in the art.
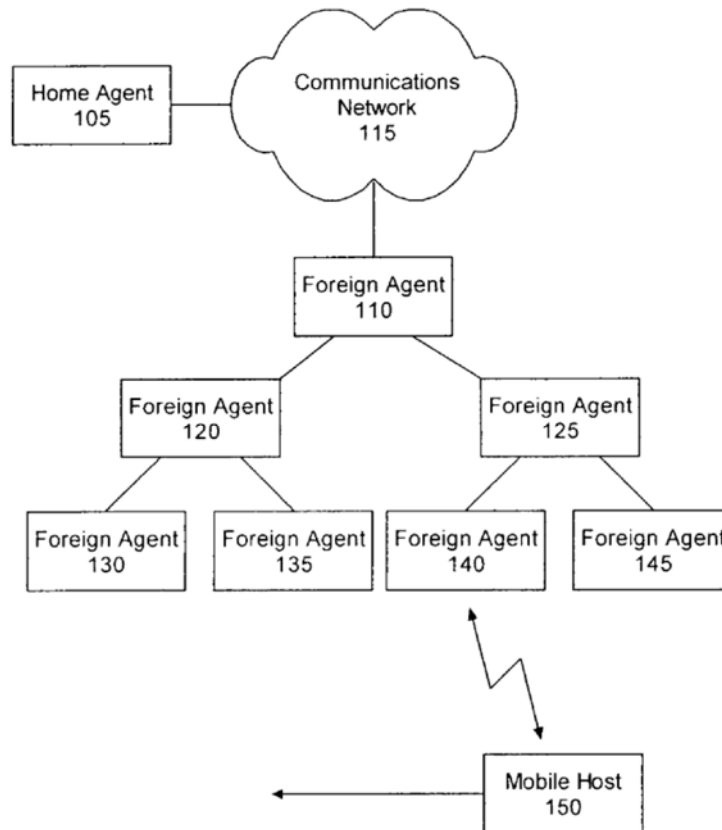
'417 Patent at Fig. 1; *see also id.* at 1:56-2:19 ("[T]he system 100 can include a home agent 105 and a foreign agent 110, each communicatively linked via a communications network 115 such as the Internet.").

119.   U.S. Patent Publication No. 2003/0016655 ("Gwon"), which the patentee distinguished during the prosecution of the '508 Patent, also provides helpful illustrations. For example, Figure 1 of Gwon reproduced below with annotations, illustrates that a "home agent"

(circled in blue) is on a "home network" (shaded in blue), and a "foreign agent" (circled in red) is

on a "visited network" (shaded in red) separate from the "home network."
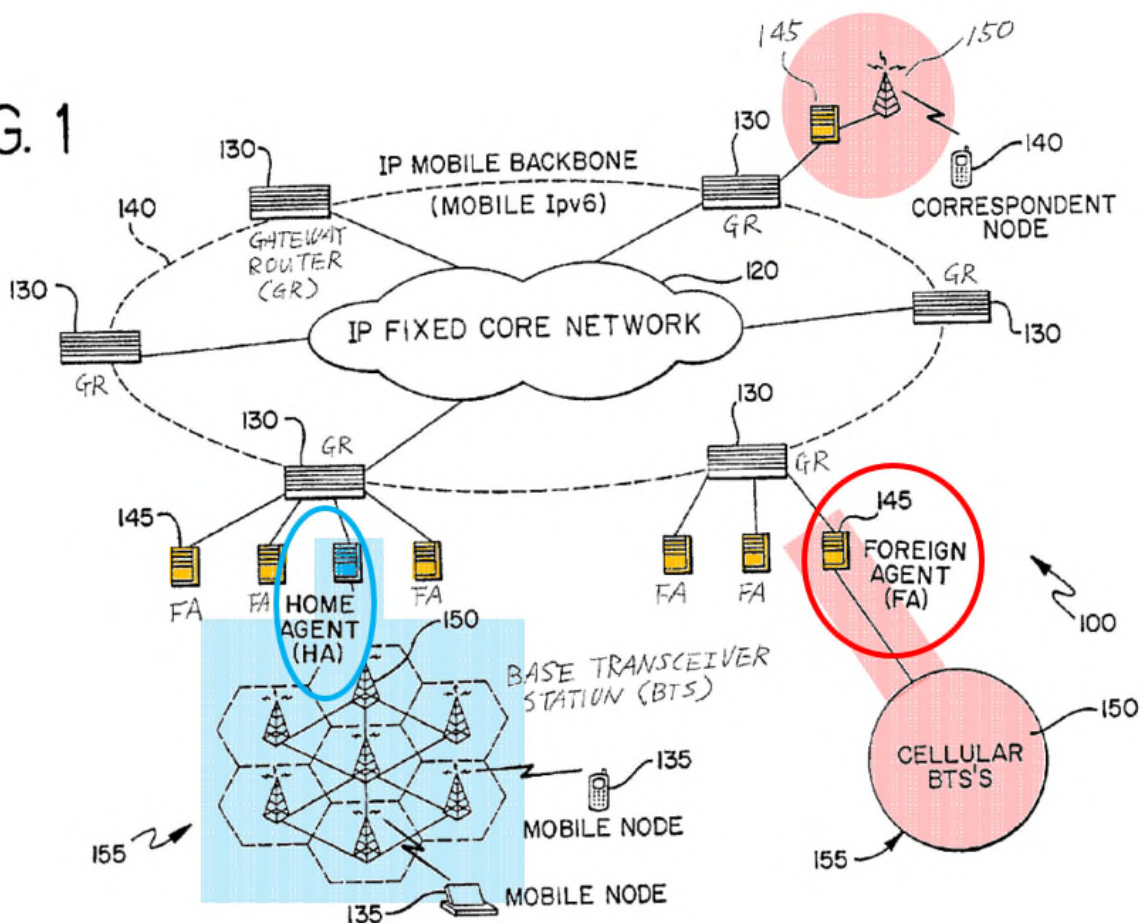
Gwon at Fig. 1. In describing Figure 1, Gwon states:

> Pursuant to RFC 2002, each mobile node is assigned a home network. ***Each mobile node 135, 140 has a home agent 145, which comprises a router on the mobile node's home network***, which maintains current location information for the mobile node and which can route packets to the mobile node at its current location. ***Other agents 145 function as foreign agents which a mobile node can "visit" while away from its home network area. Whichever home agent or foreign agent a mobile node 135, 140 happens to be communicating with at a given time establishes a network link and provides network access to the mobile node***. Each node in the network, including the mobile nodes, correspondent nodes, and agents, has a unique IP address just as in conventional fixed node data networks employing conventional Internet protocols.

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> The mobile nodes 135, 140 communicate with the agents 145 by way of base transceiver stations 150. An agent 145 may have network connections to multiple BTS's 150. Each BTS 150 comprises a node in the network and has a unique IP address like any other network node. ***Each agent 145 serves a sub-network 155 of BTS's 150 and functions as an interface between the sub-network 155 and the data network 100***. The mobile nodes 135, 140 and the BTS's employ known W-CDMA or similar digital data communication technology to communicate with each other.
>
> The construction, arrangement, and functionality of the agents 145 and subnetworks 155 of BTS's are conventional and known. Similarly, the implementation of CDMA, W-CDMA or similar digital data communication technology in wireless, mobile node devices 135 and BTS's, and the implementation of digital data communications between the two entities is conventional and known.

Id. at ¶¶ 39-41 (emphasis added). Importantly, Gwon recognizes that each base transceiver station (BTS) beneath a "home agent" are part of the "home network," *i.e.*, they do not individually form separate foreign or visited networks.

2. "Area / Region Covered by the Foreign Agent"

120.   Another issue concerns the meaning of the phrase "the physical area [or region] covered by the foreign agent" used in the Court's claim constructions of "ghost mobile node" and "when the mobile node is located in a geographical area where the foreign agent is not physically present." The parties have referred to the "the physical area [or region] covered by the foreign agent" as the "coverage area" of the foreign agent.

121.   In his report, Dr. Nair opines that "a coverage area depends on multiple factors and is basically defined by the eNodeB itself. The eNodeB determines where its coverage area ends, and the coverage area of an adjacent eNodeB begins." Nair Report at ¶ 233. "The coverage area should not be defined by just a fixed area of signal strength. The proper coverage area on LTE is not found where the signal strength is less than X dBm, but rather is defined due to the hard handover decisions driven by the LTE network nodes." *Id.* at ¶ 234. He further states:

154. Furthermore, in Paragraphs 167 to 204 of the Nair Report, Dr. Nair provides some general opinions regarding the accused handover processes, much of which is not included in his element-by-element infringement analysis for the '417 Patent. It is unclear what portions, if any, of his general opinions apply to his infringement analysis. In my analysis, I attempt to address the allegations that appear relevant to the Asserted Claims, but I reserve the right to amend my Report to the extend Dr. Nair is permitted to clarify or modify his analysis.

A. Claim 1

1. [1a] A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:

155. It is my opinion that element [1a] is not found in Verizon's LTE network. In particular, Verizon's LTE network is not a "network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP)."

156. As an initial matter, it is my opinion that the phrase "the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP)" is not part of the preamble and is thus an element of Claim 1. Dr. Nair appears to agree, having provided an infringement analysis for this element specifically and not stating anything to the contrary. *See* Nair Report at ¶ 207.

157. To the extent this phrase is deemed to be part of the preamble, a person of ordinary skill in the art would understand that at least this part of the preamble is limiting because, for example, it recites specific structure that is part of the claimed system and is essential to understanding the remaining elements of Claim 1. By contrast, the preceding phrase—"a system for communicating between a mobile node and a communication network"—may be understood as a statement of purpose for the claimed system.

158.   With respect to this element, Dr. Nair makes the conclusory statement that "Proxy Mobile IPv6 is part of the requirements set by Verizon for all LTE products." Nair Report at ¶ 207. Dr. Nair cites a document called "Verizon Wireless Requirement Plan" dated February 2019, which states: "IP mobility shall be handled by GTP and/or Proxy Mobile IPv6, which are network capabilities (i.e. no device impact)." *Id.*; MWVZ00001843 at 80. Dr. Nair provides no further analysis.

159.   First, it is my understanding that this is the first mention of Proxy Mobile IPv6 by Mobility as it did not appear in Mobility's Infringement Contentions. To the extent Mobility is permitted to maintain this new theory of infringement, and to the extent Mobility or Dr. Nair submits additional arguments, evidence, testimony, etc. regarding the same, I reserve the right to supplement my analysis in this Report.

160.   Second, the '417 Patent lacks written description support and enablement that would satisfy the patentability requirements of 35 U.S.C. § 112 at least because the constructive date of invention of the '417 Patent was July 31, 2003, whereas the Proxy Mobile IPv6 standardized in IETF RFC 5213 did not exist before 2008.[4] There is no mention or support of a Proxy Mobile IP standard in the specification of the '417 Patent. Indeed, the word "proxy" does not appear even once in the specification. Also, Dr. Nair makes no attempt to demonstrate how a person of ordinary skill in the art would understand from the specification that the inventors were in possession of proxy mobile IP or would be enabled to make or carry out proxy mobile IP without undue experimentation, insofar as Dr. Nair's attempt to equate it to the Proxy Mobile IPv6 standard.

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[4] IETF RFC 5213, https://tools.ietf.org/html/rfc5213.

161.   Third, Dr. Nair's opinion regarding this element is problematic because his own citation states that IP mobility is handled by "GTP *and/or* Proxy Mobile IPv6." Based on this citation alone, Verizon may very well use the GTP protocol alone for IP mobility, and Proxy Mobile IPv6 may not be used at all. ████████████████████████

██

Moreover, from my own personal knowledge, it is very common for carriers to not implement every feature cited in standards.

162.   Fourth, the citation comes from a document dated February 2019 that "provides initial information related to Verizon Wireless Long Term Evolution (LTE) 3GPP Band 13 Network Access." MWVZ00001843 at 1. The requirements in this document "apply to all devices designed to operate on the Verizon Wireless LTE 3GPP Band 13 network [700 MHz C Block]," as opposed to other or prior implementations of Verizon's LTE network. *Id.* at 33. Furthermore, this document appears to be a draft since there are redlines throughout the document and contains the disclaimer that "[t]he information provided was considered technically accurate at the time the documents were developed, but Verizon Wireless disclaims and makes no guaranty or warranty, express or implied, as to the accuracy or completeness of any information contained or referenced herein." *Id.* at 1. Therefore, without more, it would be improper for Dr. Nair to characterize information from this document as being representative or even applicable to Verizon's LTE network as a whole.[6]

163.   In summary, element [1a] is not satisfied by Verizon's LTE Network.

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[5] ██

[6] Dr. Nair refers to this document for much of his analysis in his report, thereby rendering his analysis insufficient for other claim elements as well for this same reason.

2.   [1b] at least one mobile node;

164.   Although I do not necessarily agree with Dr. Nair's opinion, it is my opinion that Verizon's LTE network includes "at least one mobile node."

165.   In his report, Dr. Nair states, without analysis, that "all phone, tablets, iOT devices, and other connected devices in Verizon LTE network qualify as mobile nodes." Nair Report at ¶ 209. To be sure, not all phones, tablets, and Internet-of-Things (IoT) devices can connect to Verizon's LTE network, and not all devices that can connect to Verizon's LTE network are necessarily *mobile* nodes for purposes of the accused handover procedures (*e.g.*, stationary IoT devices like home appliances).

3.   [1c] at least one home agent;

166.   As discussed earlier in this Report, there is an outstanding issue as to the plain and ordinary meaning of "home agent" in relation to "foreign agent" that must be resolved before assessing infringement. *See supra* Section IX.B.1.

167.   Dr. Nair opines in his report, without any further analysis, that a "home agent is defined as the network that assigns an IP Address upon registration or first attachment to the network by the PDN Gateway." Nair Report at ¶ 210. He also states that a "Home Agent is the agent that resides in the home network and functions as the internet gateway or router." *Id.* at ¶ 213.

168.   Notably, Dr. Nair's identification of the P-GW as the "home agent" is a significant departure from Mobility's Infringement Contentions in which Mobility identified the S-GW as the "home agent." *See* '417 Patent Infringement Contentions at 15.
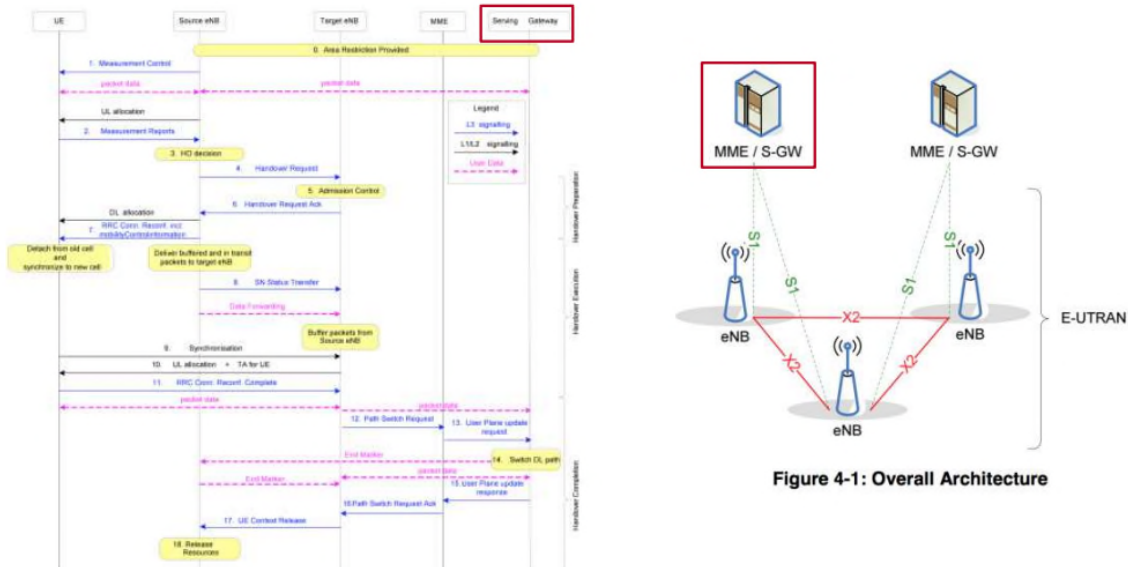
Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/08.09.00_60/ts_136300v080900p.pdf

169. Notwithstanding, I disagree with Dr. Nair's opinions. First, Dr. Nair defines a "home agent" as both a "network" and "the agent that resides in the home network," making it unclear whether he is point to a particular network or a particular node in that network. Second, his definition relies on the term "home network," but he fails to provide what "home network" means. I can only glean from his discussion of the term "foreign agent" that a "home network" is *separate* from a "visited network" and that a mobile node can "move[] away from its home network." Nair Report at ¶¶ 217-19. Third, Dr. Nair fails to provide any intrinsic support for his interpretation. His only support is a quotation from an unnamed source (but a Google search suggests that Dr. Nair directly quoted from Wikipedia).[7] *Id.* at ¶ 213.

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[7] Wikipedia – "Mobile IP," https://en.wikipedia.org/wiki/Mobile_IP (last visited June 24, 2019).

170.   I discuss my disagreement regarding Dr. Nair's interpretation of the terms "home agent" and "foreign agent" and provide my opinions regarding the plain and ordinary meaning for these terms in Section IX.B.1 above, which I incorporate by reference.   Specifically, it is my opinion that the plain and ordinary meaning of these terms require, at a minimum:

- A "**home agent**" is "a network node on a home network that assists the mobile node in receiving communications."

- A "**foreign agent**" is "a network node on a visited network that assists the mobile node in receiving communications."

- A "**home network**" is "a network separate from any visited network that provides a point of attachment to the Internet and to which a mobile node is capable of directly linking."

- A "**visited network**" is "a network separate from the home network that provides a point of attachment to the Internet and to which a mobile node is capable of directly linking."

See supra Section IX.B.1.

171.   At a minimum, Dr. Nair appears to agree that a "home network" is separate from any "visited network," and that "when a mobile phone moves away from its home network and away from the home agent's local network, it will be in a foreign network or visited network." Nair Report at ¶¶ 217-19.   That is, a mobile node could be in a "home network" or a "visited network," but not both simultaneously.

172.   Verizon's LTE network *is one network*.   To the outside world, all communications with any UE on Verizon's LTE network must go through the P-GW.   *See, e.g.*, LTE Signaling at 14 (Fig. 1.11, reproduced below).
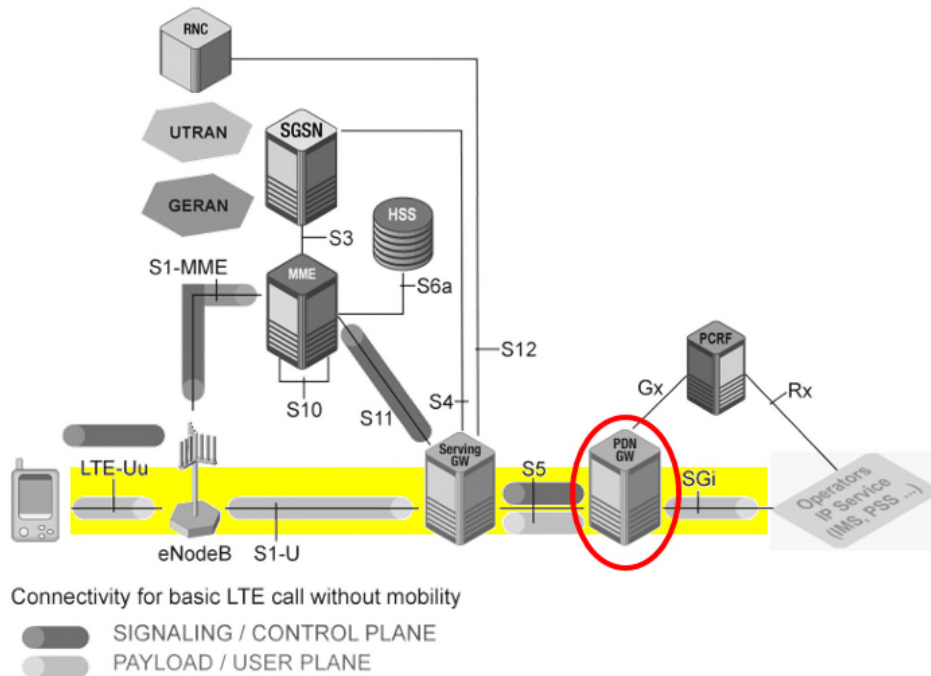
Figure 1.11   Connection via E-UTRAN non-roaming architecture.

173.   A UE moving from one eNB to another eNB is not moving to a new network. ▮

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174.   Both the '417 Patent and the Mobile IPv4 standard are all about forwarding data to

a mobile node when it is attached to a visited network and detached from its home network. Simply

put, the home network and a visited network are mutually exclusive.   For example, the

specification of the '417 Patent states:

> The home agent 205 is a network node belonging to the network that
> is designated as the home network…. By providing an addressable
> home, the home agent effectively allows the mobile node 250 to be
> reachable at its home address ***even when the mobile node 250 is not
> attached to the home network***…

---

[8] ██

> The foreign agents 210, 215, 230 exist foreign networks in so far as they are part of networks to which the mobile node 250 is communicatively linked *when the mobile node 250 is not linked directly with its home network*. *Even when the mobile node 250 is not directly linked with its home network, though, it can receive communications*.

'417 Patent at 5:9-33 (emphasis added). However, in LTE, it is impossible for a UE to receive communications from the outside world (*e.g.*, via the Internet) if the UE is attached to an eNB but detached from the P-GW. Likewise, it is impossible for a UE to receive communications while being detached from the eNB because, without the eNB, the UE could not attach to the P-GW either.

175.   In other words, to the extent each eNB is in a "visited network," the P-GW cannot be in a "home network" because the eNB and the P-GW *are not in separate networks*. The UE (a *wireless* mobile device) is simply incapable of directly linking to the P-GW (a *wired* network equipment) without going through the eNB (a *wireless* base station). Accordingly, the P-GW cannot constitute the "home agent."

176.   Conversely, each eNB cannot be in a "visited network" because it is not in a separate network from the P-GW. Also, the eNB is not a point of attachment to the Internet, rather it is a means by which a UE can connect to the P-GW, the only point of attachment to the Internet in Verizon's LTE network. By analogy, an eNB is like a WiFi router, which provides wireless access to a local and private home network, but the WiFi router alone cannot provide a point of attachment to the Internet. It must first be connected to a cable modem, which can communicate with an internet service provider, and then to the Internet.

177.   In summary, this element [1c] is not satisfied by Verizon's LTE network.

4.   [1d] at least one foreign agent;

178.   It is my opinion that element [1d] is not found in Verizon's LTE network.

179.   I incorporate by reference my discussion above regarding the plain and ordinary meaning of "home agent" versus "foreign agent." *See supra* Section IX.B.1. I also incorporate by reference my non-infringement analysis and responses to Dr. Nair's report above with respect to claim element [1c]. I further disagree with Dr. Nair's analysis in Paragraphs 216 to 223 for the reasons that follow.

180.   The Court construed the term "foreign agent" as "a network node on a visited network that assists the mobile node in receiving communications."

181.   Dr. Nair opines that "the eNodeB/S-GW component by itself or in conjunction with the S-GW" constitutes the "foreign agent." Dr. Nair draws from the Mobile IPv4 and mobile IPv6 standards to opine that "a visited network is a network other than the home network," and that "when a mobile phone moves away from its home network and away from the home agent's local network, it will be in a foreign network or visited network." Nair Report at ¶¶ 217-19. However, Dr. Nair fails to identify what the "visited network" would be in Verizon's LTE network.

182.   Notably, Dr. Nair's opinion is a significant departure from Mobility's Infringement Contentions in which Mobility identified only the eNB as the "foreign agent," and identified the S-GW as the "home agent." '417 Patent Infringement Contentions at 14-17.

'417 Patent – Claim 1 – Element (C)   17

at least one foreign agent;

➤ Defendant's Accused Product includes at least one foreign agent.
     ➤ For example, the Accused Product includes an Evolved Node B (eNB).
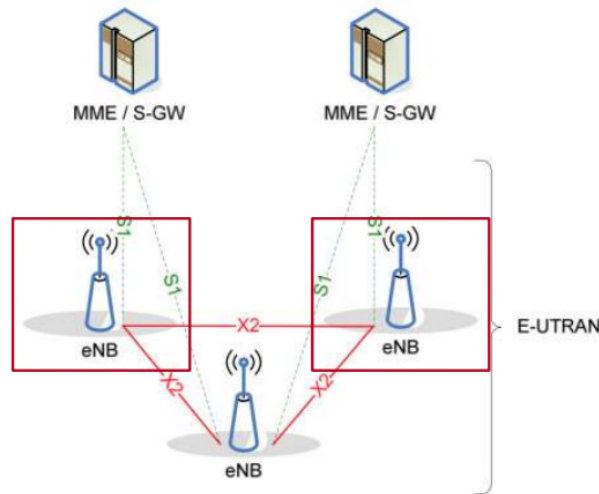
Figure 4-1: Overall Architecture

Source: https://www.etsi.org/deliver/etsi_ts/136300_136399/136300/08.09.00_60/ts_136300v080900p.pdf

183.　I also note that in Dr. Nair's analysis of other claim elements of the '417 Patent in which the term "foreign agent" appears, Dr. Nair simply treats "foreign agent" as the target eNB and does not provide any analysis for the case of an S-GW being the "foreign agent." *See* Nair Report at ¶¶ 224-55. To the extent Dr. Nair contends that an S-GW (or a combination of the eNB and S-GW) can be the "foreign agent," he provides no analysis, for example, regarding: "a ghost-foreign agent … indicate[s] presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present"; "the ghost mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent"; "wherein the ghost mobile node is a proxy element for the at least one foreign agent"; "determining a

distance, in a ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover"; and "submitting on behalf of a mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover."

184.   Dr. Nair further opines that:

> Roaming also involves visiting a foreign network. When you roam you travel to a visited network but the same is true when you move to a new eNodeB because the IP address from the eNodeB and S-GW are different from the PDN Gateway that is the UE's home agent. Further, in LTE, a GPRS Tunnel Protocol ("GTP") tunnel is required to communicate between the PDN Gateway and S-GW, and from the S-GW to the eNodeB, as well as in the opposite direction.

Nair Report at ¶ 220. Though unclear, it appears Dr. Nair is opining that eNodeBs and S-GWs are in a "visited network" as compared to the P-GW because: (i) they have a different IP address than the P-GW; and (ii) there is a tunnel between them and the P-GW. This appears to be an improper attempt to circumvent the Court's Claim Construction Order in which the Court explicitly rejected Mobility's efforts to construe "visited network" in terms of network prefixes and tunnels. *See* Claim Construction Order at 8-13; *see also supra* Section IX.B.1. He also appears to analogize to roaming, but notably he does not separately accuse roaming of infringement.

185.   Dr. Nair's definition of a "visited network" is dependent upon it being ***separate*** from the "home network," which he also fails to identify. However, nowhere in Dr. Nair's report does he identify what either the "visited network" or "home network" is with respect to Verizon's LTE network. With no such identification, Dr. Nair's allegations that the eNB or S-GW, alone or in combination, is a "foreign agent" is baseless.

186.   For the sake of argument, there is no dispute that a "foreign agent" is a node in a "visited network" and the "home agent" is a node in the "home network." I also agree with Dr. Nair that a "visited network" and the "home network" are separate networks. However, as

discussed above for the previous claim limitation, Verizon's LTE network *is one network*. *See supra* Section XI.A.3. Hence, because there is no "visited network" (and consequently no "foreign agent") in Verizon's LTE network, this element is not satisfied.

187. To the extent Dr. Nair's opinion is that the eNB and S-GW are on a different network than the P-GW by virtue of having different IP addresses, I disagree. ***Every single network node and mobile node*** in Verizon's LTE network will have a different IP address, and it is nonsensical to believe that every single node is in its own independent network, particularly in the context of the '417 Patent in which the "home agent" must be in the "home network," the "foreign agent(s)" must be in a "visited network," and a "mobile node" must be able to traverse both the "home network" and "visited network." ████████████████████████████████

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188. To the extent Dr. Nair's opinion is that the eNB and S-GW are on a different network than the P-GW by virtue of a GTP tunnel between them for data transmission, I disagree. As an initial matter, the Court specifically rejected Mobility's attempt to import tunneling into the construction of the term "foreign agent." Claim Construction Order at 12.

189. Furthermore, the discussion of tunnels in the '417 Patent is markedly different from the tunnels used in Verizon's LTE network. For example, the specification defines "tunneling" as follows:

> As used herein, tunneling refers to the transmission of data intended for use only within a private, such as a corporate, network ***through a public network*** wherein the transmission is performed in such a way that the routing nodes in the public network are unaware that

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> the transmission is part of a private network. Tunneling is generally performed by encapsulating the private network data and protocol information within the public network transmission units so that the private network protocol information ***appears to the public network as data***. Tunneling allows the use of the Internet, which is a public network, to convey data on behalf of a private network. Common examples of tunneling techniques can include, but are not limited to, Point-to-Point Tunneling Protocol (PPTP) and generic routing encapsulation (GRE). Still, any of a variety of different tunneling techniques can be used.

'417 Patent at 5:55-6:2 (emphasis added). Importantly, the inventors defined "tunneling" as referring to the transmission of data ***through a public network*** (*e.g.*, the Internet). This makes sense because Mobile IP and the '417 Patent are all about forwarding data to a mobile node when it is detached from its home network and instead attached to the Internet from a different point of attachment (*i.e.*, a visited network), as discussed earlier. *See supra* Section IX.B.1. Borrowing Figure 1 of the '417 Patent, I illustrate the difference below.
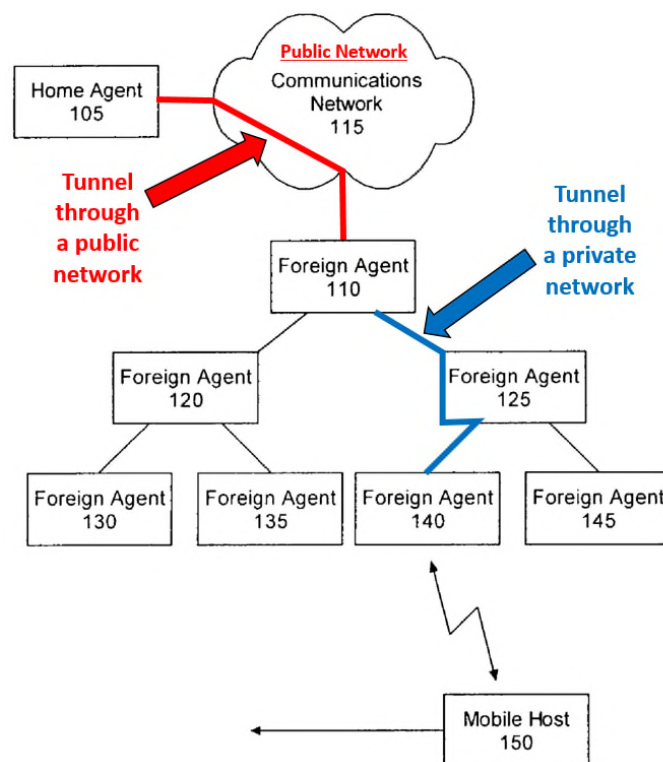
'417 Patent at Fig. 1.

190. In contrast, the Verizon LTE network *is one network*. A UE moving from one eNB to another eNB is not moving to a new network. ████████████████████████

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192. Therefore, even under Dr. Nair's interpretation, this element is not satisfied by Verizon's LTE network.

193. Furthermore, under the plain and ordinary meaning of "visited network," which requires that it be, at a minimum, "a network separate from the home network that provides a point of attachment to the Internet and to which a mobile node is capable of directly linking," this element is also not satisfied by Verizon's LTE network because: the eNB is not in a *separate* network from the P-GW that provides independent point of attachment to the Internet apart from the P-GW. *See supra* Section IX.B.1.

     5.   [1e] a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and

194. With regard to this element, the Court has provided the following constructions:

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[10] ██

[11] ██

254.   I also disagree with Dr. Nair's statement and find it vague and ambiguous. It is unclear how Dr. Nair contends that the X2 and S1 handover procedures speed up LTE's response and improves user experience for VoLTE. There are numerous features in LTE having nothing to do with handover that provide for faster response times and can be experienced without performing inter-eNB handovers. *See infra* Section XIII.A.2. Further, VoLTE is among other things a means for carrying out a voice call over a packet-switched system, whereas in 3G voice calls were primarily over circuit-switched systems. ████████████████████████████

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255.   For these reasons, element [7a] is not met in the accused LTE network.

2.   [7b] updating, in a mobile node, a location in a ghost mobile node;

256.   With regard to this element, the Court has provided the following construction:

"updating, in a mobile node, a location in a ghost mobile node"	"updating the ghost mobile node with a location of the mobile node"

257.   It is my opinion that element [7b] is not found in Verizon's LTE network.

258.   Dr. Nair opines that "[t]he location information or position is copied over to the eNodeB by Verizon. This is done by the Measurement Report and it contains device's location except when battery is less than 10% and few other exceptions." Nair Report at ¶ 244. In support, he cites the same Verizon-branded document regarding Verizon's LTE Band 13 network dated February 2019. *Id.* (citing MWVZ00001987-MWVZ00001988).

259.   I disagree for at least the reasons discussed above with respect to claim element [1f]. For example, Verizon configures its LTE network such that a UE would never send its location information in its measurement reports to the Serving eNB.

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[16] ████████████████████████████████

260.   ==Furthermore, Dr. Nair fails to demonstrate how such location information bears any relation to "speeding handover." Indeed, Dr. Nair draws from a portion of a document relating to Minimization of Drive Test (MDT) features, which are features designed to minimize drive tests performed on a network, and not necessarily used in the normal operation of LTE. *See* Nair Report at ¶ 245; MWVZ00001843 at 146.==

261.   For these reasons, element [7b] is not met in the accused LTE network.

   3.   [7c] determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;

262.   It is my opinion that element [7c] is not found in Verizon's LTE network.

263.   In Paragraphs 246 to 250 of the Nair Report, Dr. Nair appears to identify five different theories of infringement. Each of his assertions are vague, incoherent, not tied to the claim language, and not tied to the accused LTE network. In particular, in no instance does Dr. Nair demonstrate that the Serving eNB (the alleged "ghost mobile node") actually determines a distance between a UE and the closest "Target eNB/S-GW component, by itself or in conjunction with the S-GW" (the alleged "foreign agent") with which the UE can complete a handover. I disagree with each of Dr. Nair's assertions, which I address individually below.

264.   First, Dr. Nair states: "As the phone travels and UE's location is mapped to a measurement report of RSRQ (Signal strength), a distance (and location of the UE) is known through triangulation." Nair Report at ¶ 246. It is unclear what specific feature he is identifying, but to the extent he is referring to his prior allegation that a UE includes location information in its measurement reports to the Serving eNB, I disagree for the reasons discussed above for elements [1f] and [7b]. For example, Verizon configures its LTE network such that a UE would never send its location information in its measurement reports to the Serving eNB. Furthermore, methods such as triangulation may generally be used to determine the physical location of a UE,

but this is not a determination of a distance between the mobile node and the closest foreign agent to which the mobile node can complete a handover.

265.   Second, Dr. Nair states: "Distance is also computed by the E911 requirements of the phone, and approximately known by the MME. The measured RSRQ values correspond to the distance of a UE to a Foreign Agent or eNodeB." Nair Report at ¶ 247. Notably, this theory was absent in Mobility's Infringement Contentions. To the extent that Dr. Nair is permitted to maintain this argument, I disagree for at least the reasons discussed above for element [1f]. For example, the measured RSRQ values (*i.e.*, signal quality) is not a measure of distance. Furthermore, any determination of the physical location of a UE is not the same as determining a distance between the mobile node and the closest foreign agent to which the mobile node can complete a handover.

266.   Third, Dr. Nair states: "By solving the inequality with A3, A2, A1 events, or other events, the closest distance is computed, indirectly. In fact, Minimized Drive Test (MDT) maps location to signal strength." Nair Report at ¶ 248. It is unclear what feature Dr. Nair accusing, but to the extent he is referring to the UE's measurement reports pertaining to certain handover events (*e.g.*, Event A3), I disagree for at least the reasons discussed above for element [1f]. For example, no person of ordinary skill in the art (POSITA) would equate signal strength with distance. Also, Verizon configures its LTE network such that a UE would never send its location information in its measurement reports to the Serving eNB. Furthermore, this claim element requires the Serving eNB (the alleged "ghost mobile node") to determine the distance, whereas here it is the UE performing the measurements.

267.   Fourth, Dr. Nair states: "For cases in which, a Femto-cell is used this association is even more evident, including SON." Nair Report at ¶ 249. Notably, this theory was absent in Mobility's Infringement Contentions. Also, it is unclear how the use of femtocells and SON are

relevant to this claim element or to Verizon's LTE network, since Dr. Nair provides zero explanation. To the extent that Dr. Nair is permitted to maintain this theory, and to the extent Dr. Nair is referring to self-organizing networks (SON), I disagree. Generally speaking, SON is a set of various automation features that assist with network planning and optimization, among other things. One of the features is an automatic neighbor relations (ANR) function described in 3GPP TS 36.300. ANR generally a Serving eNB having a table of neighboring eNBs and using a UE's measurement reports to detect a new eNB and updating its table with the identity of that new eNB. *See* TS 36.300 v.10.7.0 at § 22.3.3. As illustrated by the figure below, there is no exchange of distance or location information, and more importantly there is no determination of a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover. Furthermore, as discussed earlier with respect to element [1f], no POSITA would equate signal strength to distance. Further still, Dr. Nair fails to prove that any of these features are in use in Verizon's LTE network.

268. In closer examination of the figure below, one can observe that in step 1, only the Phy-CID (*e.g.*, PCI) is reported. In step 2, the cell requests that the UE determine the actual identity of the cell (Global cell Id) associated with the PCI=5, which was reported in step 1. In step 2B, the UE receives the SIB1 broadcast from Cell B, and determines the Global Cell Id. In Step 3, the UE reports the Global Cell Id associated with Phy-CID=5 to the cell A. First, this figure confirms that the measurement report and the included Phy-CID=5 in step 1 does not contain the identity of the eNodeB associated with cell B, and the obtaining a Phy-CID (PCI) does not provide such an association. Secondly, this figure confirms that any provision of a list of PCIs to a UE does not constitute making a mobile node aware of the presence of any eNodeB (accused FA).

22.3.3 Intra-LTE/frequency Automatic Neighbour Relation Function

The ANR (Automatic Neighbour Relation) function relies on cells broadcasting their identity on global level, E-UTRAN Cell Global Identifier (ECGI).
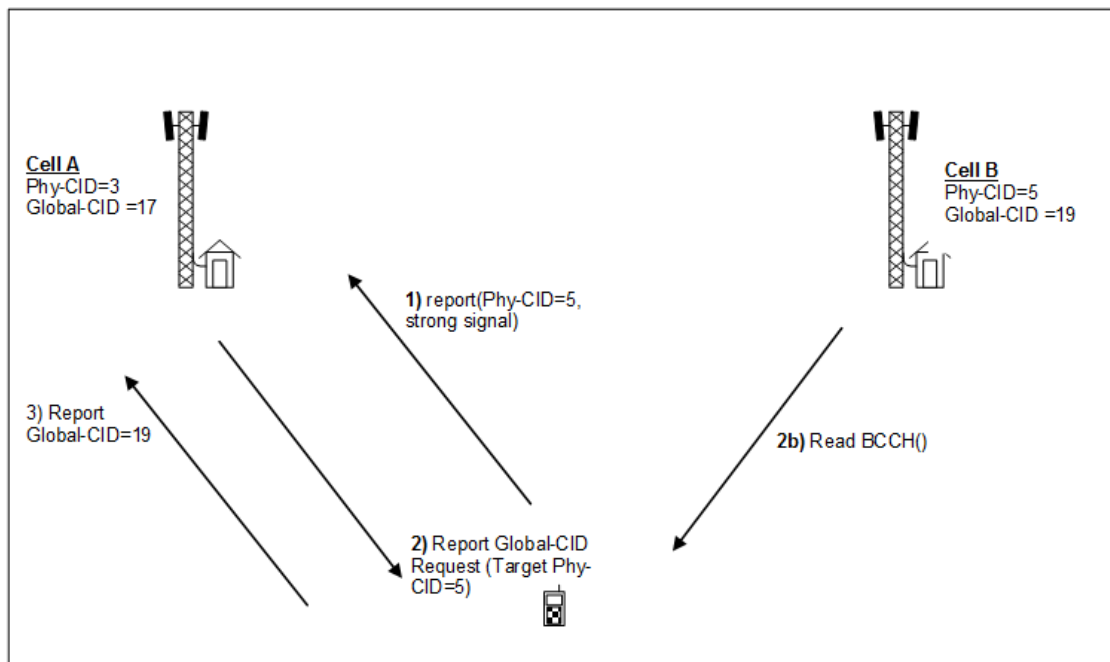

Figure 22.3.3-1: Automatic Neighbour Relation Function

269.   Fifth, Dr. Nair states: "For the femtocell cases, Verizon requires "Proximity Indication" to CSG Cells. CSG stands for Closed Subscriber Group (CSG)." Nair Report at ¶ 250. Notably, this theory was absent in Mobility's Infringement Contentions. Also, it is unclear how "Proximity Indication" is relevant to this claim element or to Verizon's LTE network, since Dr. Nair provides zero explanation. To the extent that Dr. Nair is permitted to maintain this theory, I disagree.

270.   Dr. Nair simply cites, without explanation, to a Verizon-branded document dated February 2019 in which it states that: "***The device shall send*** a ***ProximityIndication message*** to the network whenever it detects or leaves the presence of CSG or hybrid cells ***if configured by the network to do so*** per section 5.3.14 of 3GPP TS 36.331." *Id.*; MWVZ00001843 at 193-94 (emphasis added). Dr. Nair's own citation reflects the problem with his assertion, as emphasized:

(i) it is the UE, and not the serving eNB, that detects whether it is entering or leaving the presence of CSG or hybrid cells; (ii) Dr. Nair fails to prove whether Verizon actually configures its network to enable this feature; and (iii) a ProximityIndication message is no more than an indication to the Serving eNB that the UE is "entering" or "leaving" a CSG cell, as evidenced by Section 5.3.14.3 of TS 36.331 v.10.7.0 reproduced below.

5.3.14.3 Actions related to transmission of *ProximityIndication* message

The UE shall set the contents of *ProximityIndication* message as follows:

1> if the UE applies the procedure to report entering the proximity of CSG member cell(s):

    2> set *type* to *entering*;

1> else if the UE applies the procedure to report leaving the proximity of CSG member cell(s):

    2> set *type* to *leaving*;

1> if the proximity indication was triggered for one or more CSG member cell(s) on an E-UTRA frequency:

    2> set the *carrierFreq* to *eutra* with the value set to the E-ARFCN value of the E-UTRA cell(s) for which proximity indication was triggered;

1> else if the proximity indication was triggered for one or more CSG member cell(s) on a UTRA frequency:

    2> set the *carrierFreq* to *utra* with the value set to the ARFCN value of the UTRA cell(s) for which proximity indication was triggered;

The UE shall submit the *ProximityIndication* message to lower layers for transmission.

271.   For these reasons, element [7c] is not met in the accused LTE network.

    4.   [7d] submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and
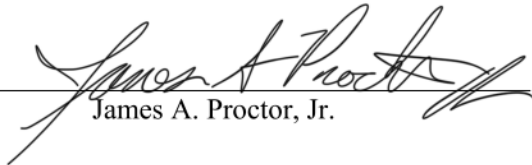
272.   It is my opinion that element [7d] is not found in Verizon's LTE network.

273.   For example, Verizon's LTE network does not include a "foreign agent" or a "ghost mobile node" for at least the reasons discussed above for elements [1d] and [1f] above.

274.   Furthermore, Dr. Nair once again accuses CSG cells and the Proximity Indicator as satisfying this element. He states: "The Proximity Indicator is a message that determines and implements Element 2 of the Claim and then Element 3 follows as part of the Handover process and S1AP handover. This is established in TS 36.331 as part of CSG Cells. In a similar fashion

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 4th day of July, 2019, in _INDIACANTIC, FL_ .

_____
James A. Proctor, Jr.